

# ECOLOGY

COLLEGE OF LETTERS & SCIENCE | MONTANA STATE UNIVERSITY



- 1** Student Dan Bachen weighs a Columbia spotted frog for a mark-recapture study in Montana's Bitterroot Mountains
- 2** Ecology faculty and students collect data on a Weddell seal mother and pup in Antarctica
- 3** Student Joe Smith weighs a Great Basin pocket mouse in Wyoming
- 4** Professor Bob Garrott and student Shana Dunkley scan for elk activity in Yellowstone National Park
- 5** Students tag trout in the upper Clark Fork River, Montana

The Department of Ecology at Montana State University offers undergraduate majors a broad range of general and ecologically-oriented biological sciences. Faculty specializations in the department and courses offered include plant and animal ecology, evolutionary biology, conservation biology, quantitative biology, terrestrial and aquatic resources and management, and conservation genetics. Undergraduate majors work toward a Bachelor of Science degree in Biological Sciences in one of the following four options:

## Biology Teaching Option

The Biology Teaching Option certifies graduates to be qualified to teach secondary school biology. It is similar to the Organismal Biology Option, but includes professional preparation courses required for state teacher certification. Since the Biology Teaching Option includes 40 credits of biology courses, it is an extended major and the State of Montana does not require a teaching minor.

## Conservation Biology and Ecology Option

The primary goal of the Conservation Biology and Ecology Option is to give students a clear understanding of the ways that natural and human-related processes affect biological diversity and relate this knowledge to its broad societal context. The program of study for the Conservation Biology and Ecology Option will train students broadly and comprehensively in ecology and conservation biology, provide extensive coursework in the scientific method and statistical analysis, and be highly interdisciplinary, reflecting the broad scope of conservation biology.

## Fish and Wildlife Management and Ecology Option

The option in Fish and Wildlife Management and Ecology is a professional degree program offered for those students who have an interest in employment in these fields. Study leading toward a bachelor's degree emphasizes basic principles of animal ecology, with considerable work in related fields.

## Organismal Biology Option

The Organismal Biology Option provides a rigorous program of study in plant or animal biology at the whole-organism, species, population and community levels, while allowing students flexibility in selecting those biology courses that best meet their interests and objectives. It accomplishes this by requiring students to select 20 required credits in biology in consultation with their advisor to achieve a personal curriculum.

### For additional information, contact:

Department of Ecology  
Montana State University  
310 Lewis Hall  
P.O. Box 173460  
Bozeman, MT 59717-3460

Tel: 406-994-4548

Fax: 406-994-3190

[www.montana.edu/ecology/](http://www.montana.edu/ecology/)



## Options within Major

- Biology Teaching
- Conservation Biology & Ecology
- Fish & Wildlife Management & Ecology
- Organismal Biology

## Graduate Degrees

- M.S. in Biological Sciences
- M.S. in Fish & Wildlife Management
- Ph.D. in Fish & Wildlife Biology
- Ph.D. in Biological Sciences
- Ph.D. in Ecology & Environmental Sciences

## What can I do with a degree in Biological Sciences?

- Biologist
- Biophysicist
- Biostatistician
- Botanist
- Conservationist
- County extension director
- Ecologist
- Ecotourism coordinator
- Embryologist
- Environmental health educator
- Environmental impact analyst
- Environmental educator
- Environmental planner
- Firewarden
- Fish hatchery manager
- Fisheries biologist
- Forester
- Geneticist
- Geographic information systems analyst
- Grass roots coordinator
- Laboratory researcher
- Laboratory technician
- Lobbyist
- Marine biologist
- Mycologist
- Natural resources manager
- Naturalist
- Parasitologist
- Park conservationist
- Park superintendent
- Pathologist
- Plant quarantine specialist
- Preserve manager
- Public affairs manager
- Research assistant
- Soil conservationist
- Statistician
- Teacher
- Technical writer
- Toxicologist
- Veterinarian
- Water resources manager
- Watershed technologist
- Wildlife biologist
- Wildlife Manager
- Zoologist

Most professional positions in ecology and fish and wildlife require an M.S. or Ph.D. The undergraduate program at MSU is designed to prepare students for graduate study, while allowing the flexibility to develop an area of specialization, or to study a broad range of disciplines related to ecology.

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## EDUCATIONAL FACILITIES

Teaching and research laboratories provide access to and training in contemporary field and laboratory technologies and methodologies. Field courses use the varied ecosystems present within easy driving distance from campus, ranging from high plains to alpine environments, as one of the best outdoor laboratories in the nation. Certain summer courses also use the natural setting of Yellowstone National Park for field-oriented education.

The MSU Libraries provide an outstanding service in making materials available to students. In addition to the extensive collection of materials in biological sciences, the libraries are also a Selective Depository for federal, state and Canadian government documents and have a number of special collections in biological sciences. The libraries have also been a pioneer in providing computer-based access to federal databases on a wide range of topics.

## RESEARCH OPPORTUNITIES

In the Department of Ecology, students are strongly encouraged to gain research experience. This can be done by enrolling in undergraduate research courses in which the student works closely with a faculty member for a least a semester. Another approach is through summer employment on research projects, on campus or with state or federal agencies, as a paid or volunteer worker. Some examples of recent or current department research programs include:

- Land impact studies
- Population studies of managed or threatened and endangered species
- Inter-specific relationships between native mammals and fisheries
- Effects of climate upon the population ecology of large mammals
- Behavioral ecology of wolves
- Ecology and habitat management of waterfowl
- Raptor habitat studies
- Bird population studies in relation to land use changes
- Ecological factors limiting numbers and distribution of African wild dogs
- Inter-specific competition between carnivores
- Effects of tourist hunting on African lion populations
- Ecology of warm- and cold-water fisheries
- Management of whirling disease

